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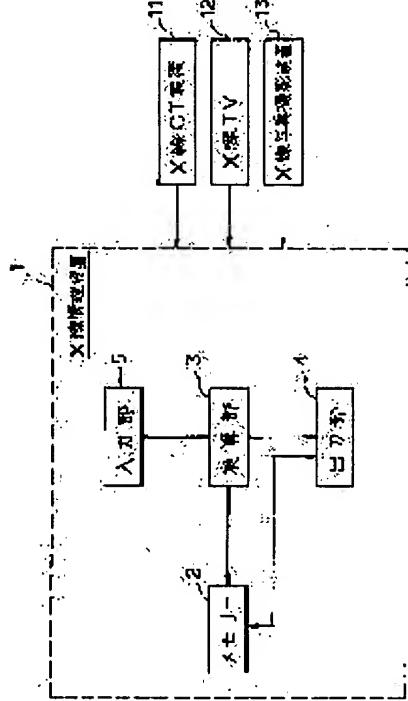
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(54) X-RAY CONTROLLING APPARATUS

(57) Abstract:

PURPOSE: To provide an X-ray controlling apparatus which enables an X-ray exposure dose or an X-ray exposure to be efficiently managed to protect a patient from excessive irradiation with X-rays.

CONSTITUTION: An X-ray controlling apparatus 1 is provided with a memory 2 as a storage medium capable of storing a specified control value in X-ray irradiation, an arithmetic section 3 which computes a forecast value of the amount of X-rays to be managed before the irradiation therewith while reading the control value in the past involving the same subject from a memory 2 to allow the sum of the control value to be computed and the forecast value as accumulated value and an output section 4 capable of outputting at least either the forecast value or the accumulated value.



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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram of the X-ray management equipment of this example.

[Drawing 2] The flow chart explaining the procedure of managing the amount of X-ray irradiation using the X-ray management equipment of this example.

[Description of Notations]

1 X-ray Management Equipment

2 Memory (Storage)

3 Operation Part

4 Output Section

5 Input Section

11 X-ray CT Scanner

12 X-ray Television

13 X Photography Equipment

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates the amount of X-ray irradiation or the amount of X-ray exposures in the case of using an X-ray CT scanner etc. to manageable X-ray management equipment to a predetermined allowed value.

[0002]

[Description of the Prior Art] As an X-ray use device which uses an X-ray, and diagnoses or treats a patient, although there are X photography equipment, X-ray television, an X-ray CT scanner, etc., when every equipment irradiates an X-ray at a patient, a predetermined image can be obtained.

[0003] Here, in an X-ray CT scanner, the amount of X-ray irradiation is recorded for every image as one of the conditions at the time of photography, and there is also a thing whose display of the sum total for every inspection is still attained.

[0004]

[Problem(s) to be Solved by the Invention] however, the information what X-ray was irradiated in the past to the predetermined patient will be arranged in the form unified not necessarily, if it sees by the whole X-ray use device -- not having -- every X line each use device -- an individual exception -- a record-medium top -- or the present condition is recorded on the document.

[0005] On the other hand, a medical practitioner etc. needs to take care enough so that the X-ray exposure to a patient may not exceed a predetermined allowed value.

[0006] Therefore, a judgment whether an X-ray may be irradiated at a patient had to be made after investigating each individual record, and it was very complicated.

[0007] Moreover, the allowed value of X-ray exposure needed to investigate [how much it is also or / the medical practitioner etc.] each time.

[0008] This invention was not made in consideration of the situation mentioned above, and aims at offering the X-ray management equipment which can manage efficiently X-ray exposure or the amount of X-ray irradiation so that an excessive X-ray may not be irradiated to a patient.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, as indicated to claim 1, the X-ray management equipment of this invention The amount of managements of the storage which can memorize the predetermined amount of managements when performing X-ray irradiation, and the past which the same analyte takes while calculating the forecast of said amount of managements before performing X-ray irradiation is read from said storage, and the sum of these amounts of managements and said forecasts is made into an accumulation value. The operation part in which an operation is possible, It has the output section of said forecast and said accumulation value in which an output of either is possible at least.

[0010]

[Function] According to the X-ray management equipment of this invention, it calculates as a forecast first using the data of the inspection plan performed by the X-ray use device, for example, an X-ray CT scanner, the amount of managements of X-ray irradiation, for example, amount, in the inspection.

[0011] Next, the amount of managements of the past concerning the same analyte is read, and the value which applied the forecast of the amount of managements to the sum total of these amounts of managements is calculated as an

accumulation value.

[0012] Subsequently, it outputs at least in the output section of a forecast and an accumulation value equipped with either for the monitor etc.

[0013] when according to the desirable example of this invention predetermined is comparatively alike and the forecast has reached to the allowed value of the amount of managements to one exposure, or when predetermined is comparatively alike and the accumulation value has reached to the allowed value of the amount of managements to two or more exposures over a predetermined period, predetermined warning is outputted to a monitor etc.

[0014]

[Example] Hereafter, the example of the X-ray management equipment of this invention is explained with reference to an accompanying drawing.

[0015] Drawing 1 shows the X-ray management equipment of this example with a block diagram.

[0016] As shown in this drawing, the X-ray management equipment 1 of this example has memory 2 as a storage which can memorize the amount of X-ray irradiation as a predetermined amount of managements when performing X-ray irradiation. While calculating the forecast of the amount of X-ray irradiation before performing X-ray irradiation, the amount of X-ray irradiation of the past concerning the same analyte is read from memory 2, and it has the operation part 3 in which an operation is possible, and the output section 4 in which an output of a forecast and an accumulation value is possible by making the sum of these amounts of X-ray irradiation and forecasts into an accumulation value.

[0017] Moreover, the X-ray management equipment 1 of this example is equipped with the input section 5 which can input predetermined operating instructions etc.

[0018] The X-ray management equipment 1 of this example is connected to the various X-ray use devices 11, for example, an X-ray CT scanner, X-ray television 12, and X photography equipment 13 grade, and operation part 3 calculates the forecast of the amount of X-ray irradiation for the data of the inspection plan performed by the X line each use device using a receipt and this inspection plan data.

[0019] Memory 2 is good to memorize the amount of X-ray irradiation for every modality and every X-ray use device.

[0020] Operation part 3 is good to have attained the operation of the total accumulation value which totaled all modality in consideration of inspecting by two or more modality depending on condition of disease while it calculates an accumulation value for every modality.

[0021] The output section 4 is equipped with the monitor which can display the forecast and accumulation value which were calculated by operation part 3.

[0022] These data are good to be expressed as real time.

[0023] Moreover, the output section 4 performs predetermined warning, when the forecast and accumulation value which were calculated by operation part 3 have exceeded each allowed value, while reading the allowed value of the amount of X-ray irradiation to one exposure, and the allowed value of the amount of X-ray irradiation to two or more exposures over a predetermined period from memory 2.

[0024] It is possible to output the predetermined message which sounds an alarm, for example to a monitor as predetermined warning etc.

[0025] Next, the procedure of managing the amount of X-ray irradiation using the X-ray management equipment of this example is explained with reference to the flow chart of drawing 2.

[0026] In order to manage the amount of X-ray irradiation using the X-ray management equipment of this example, it calculates by operation part 3 first using the data of the inspection plan performed by the X-ray use device by making the amount of X-ray irradiation in the inspection into a forecast (step 101).

[0027] Next, the amount of X-ray irradiation of the past concerning the same analyte is read from memory 2, and the value which applied the above-mentioned forecast to the sum total of these amounts of X-ray irradiation is calculated as an accumulation value (step 102).

[0028] Next, a forecast and an accumulation value are outputted to a monitor.

[0029] At this time, a forecast, the accumulation value for every modality, and the total accumulation value are displayed on a monitoring screen.

[0030] Next, a predetermined alarm is outputted when either the forecast, the accumulation value for every modality or the total accumulation value has exceeded the corresponding allowed value (step 104).

[0031] For example, what is necessary is just to display "It is over an allowed value" on the right-hand side column of the value exceeding the allowed value.

[0032] Next, in judging whether an inspection plan is redone when an alarm is outputted and redoing an inspection plan, after a X line each use device performs an inspection plan again, it repeats the procedure from step 101.

[0033] A scan is stopped when not redoing an inspection plan (step 105).

[0034] On the other hand, when the forecast, the accumulation value for every modality, or the total accumulation value has not exceeded each allowed value, a scan is performed (step 106) and the amount of X-ray irradiation (actual measurement) is memorized in memory 2 after scanning termination (step 107).

[0035] What is necessary is just to carry out similarly in other X-ray use devices, although the above explanation made the example the case where it inspected with an X-ray CT scanner.

[0036] As explained above, since the X-ray management equipment of this example was constituted so that the past amount of X-ray irradiation might be memorized in memory, these might be read and an accumulation value might be totaled by operation part, it can calculate quickly the accumulation value of the amount of X-ray irradiation compared with the former which was being performed by hand calculation.

[0037] Moreover, when the forecast of the amount of X-ray irradiation of inspection which it is going to conduct from now on has exceeded the predetermined allowed value, Or since it constituted so that a predetermined alarm might be outputted when the accumulation value which totaled the amount of X-ray irradiation of the past till then to the forecast had exceeded the predetermined allowed value When the amount of X-ray irradiation exceeds limiting value, he can respond promptly also to the inquiry from a patient while an operator can perceive this in advance efficiently, and can stop a scan or can reexamine a scanning plan.

[0038] Moreover, since the X-ray management equipment of this example was constituted so that the amount of X-ray irradiation might be memorized over the whole X-ray use device which recognizes various existence, it can manage efficiently the total amount of exposures to all inspection.

[0039] Although the predetermined amount of managements was made into the amount of X-ray irradiation in the above-mentioned example, X-ray exposure is evaluated using data, such as the amount of X-ray irradiation, and weight of the subject, and it is good also considering this X-ray exposure as an amount of managements.

[0040] Moreover, although X-ray management equipment was constituted from an above-mentioned example independently of various X-ray use devices, for example, an X-ray CT scanner etc., you may build in an X-ray CT scanner etc.

[0041] Moreover, although it constituted from an above-mentioned example so that the amount of X-ray irradiation in that inspection might be calculated as a forecast by operation part using the data of the inspection plan performed by the X line each use device, this operation may be performed by the X line each use device side instead of operation part.

[0042] Moreover, although it constituted from an above-mentioned example so that predetermined warning might be emitted when a forecast and an accumulation value exceeded each allowed value, it is good also as a configuration which may constitute so that predetermined warning may be emitted when 80% of an allowed value is reached, for example, and always displays the rate to an allowed value.

[0043]

[Effect of the Invention] As stated above, the X-ray management equipment of this invention The amount of managements of the storage which can memorize the predetermined amount of managements when performing X-ray irradiation, and the past which the same analyte takes while calculating the forecast of said amount of managements before performing X-ray irradiation is read from said storage, and the sum of these amounts of managements and said forecasts is made into an accumulation value. The operation part in which an operation is possible, By having had the output section of said forecast and said accumulation value in which an output of either is possible at least, X-ray exposure or the amount of X-ray irradiation is efficiently manageable so that an excessive X-ray may not be irradiated to a patient.

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CLAIMS**[Claim(s)]**

[Claim 1] The amount of managements of the storage which can memorize the predetermined amount of managements when performing X-ray irradiation, and the past which the same analyte takes while calculating the forecast of said amount of managements before performing X-ray irradiation is read from said storage, and the sum of the amount of managements of said past and said forecast is made into an accumulation value. The operation part in which an operation is possible, X-ray management equipment characterized by having the output section of said forecast and said accumulation value in which an output of either is possible at least.

[Claim 2] the X-ray management equipment according to claim 1 which outputs predetermined warning when predetermined boils said output section comparatively and said forecast has attained it to the allowed value of the amount of managements to one exposure, or when predetermined is comparatively alike and said accumulation value has reached to the allowed value of the amount of managements to two or more exposures over a predetermined period.

[Claim 3] While said storage memorizes said amount of managements for every modality, said output section is X-ray management equipment of said forecast and said accumulation value according to claim 1 which outputs either for every modality at least.

[Claim 4] Said output section is X-ray management equipment [equipped with the monitor of said forecast and said accumulation value which can display either at least] according to claim 1.

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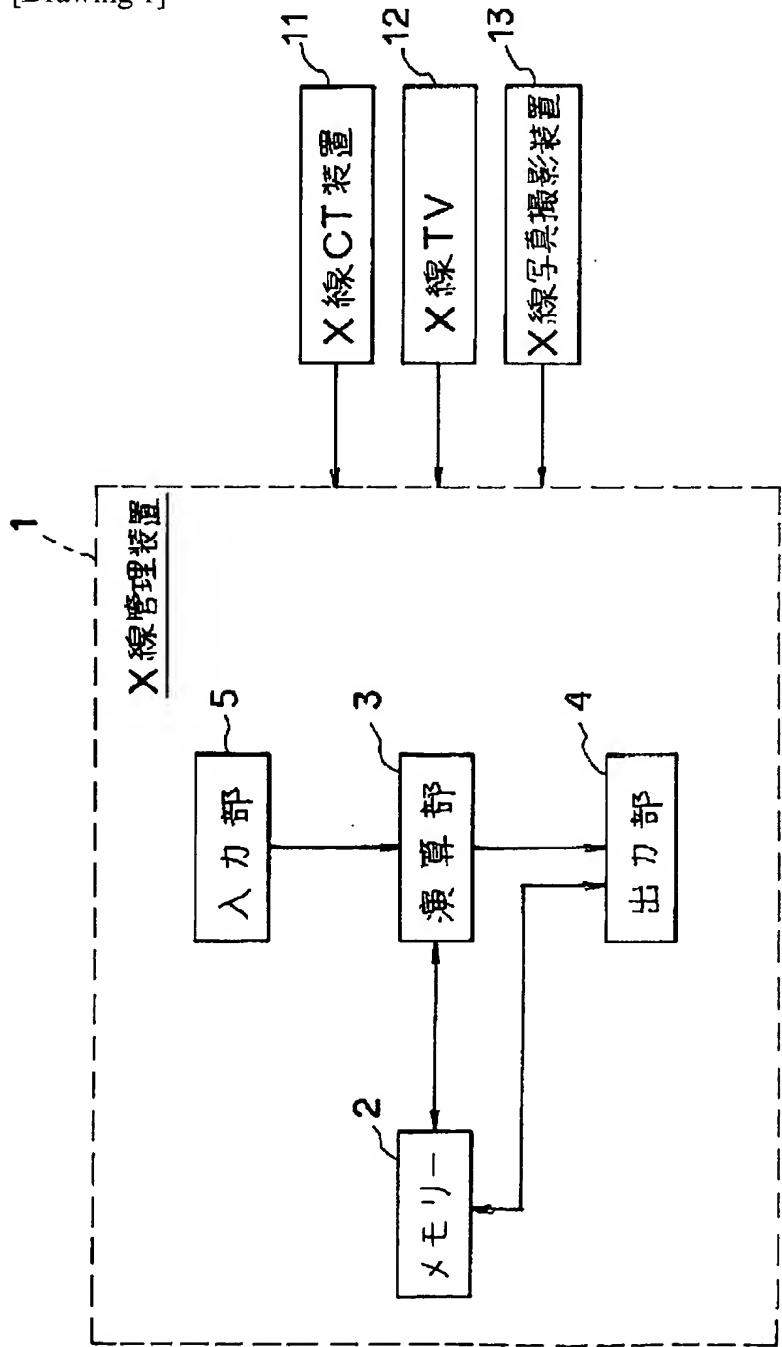
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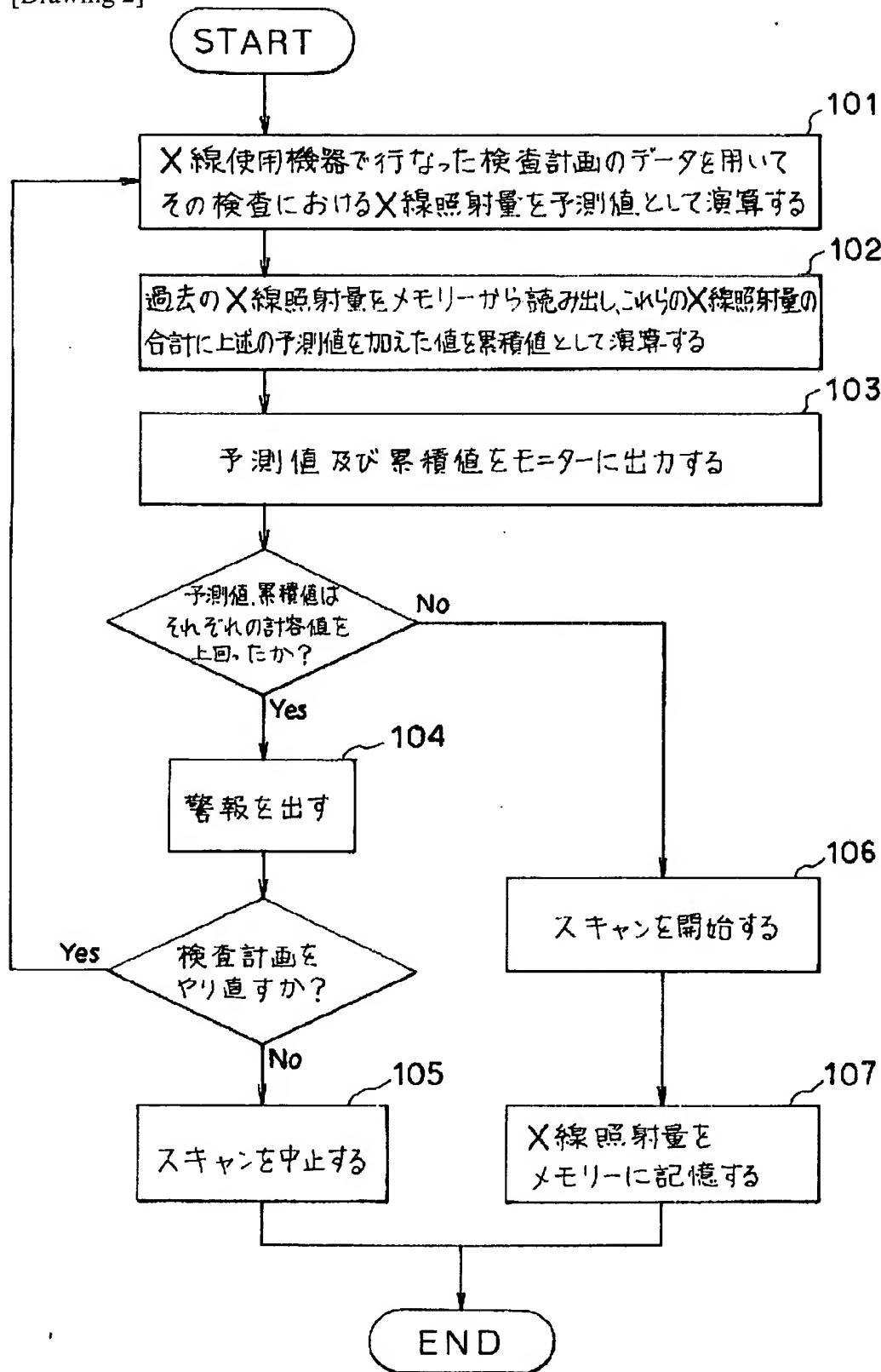
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DRAWINGS

[Drawing 1]



[Drawing 2]



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